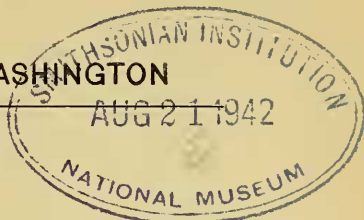


PROCEEDINGS
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SOME NOTES ON THE TAXONOMY OF GRAIN MITES.
(ACARINA: ACARIDAE, FORMERLY
TYROGLYPHIDAE).

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The term "grain mites" has been applied either to some or all of the members of a group long known under the family name Tyroglyphidae. It is here used in the broader sense as applied to all members of that group. The name "cheese mites" also has been given to members of the same family, but is less appropriate when applied to the entire family, since the mites are not so frequently found in cheese as in grain. These acarids are medium sized, with a soft skin, and bear long and frequently beautifully modified setae. While most of the external structures may be adequately studied with lower magnifications of the compound microscope, the very fine barbs and other structures of these large, modified setae can be properly observed only in specially mounted specimens and with the aid of an oil-immersion lens. It is for this reason that nearly all the earlier descriptions of these mites are inadequate, and also the reason why the synonymy of the different species has become greatly involved.

The notes here presented are the result of the joint studies of the two authors, made at the United States National Museum late in the year 1941. The material at hand was that contained in the National Museum, plus a large collection of Canadian grain mites and some exchanges from abroad. The old types in the National Museum were found usually to have been mounted in balsam and were therefore in rather poor shape for study. Fortunately, however, usually several or even many cotypes of a single species were present, and structures which would have been missed on a single mount were finally fairly well appraised by a study of many specimens mounted in different positions.

THE PROPER FAMILY NAME FOR GRAIN MITES.

The accepted family name for the grain mites for over half a century has been Tyroglyphidae, based upon the genus *Tyroglyphus*, established by Latreille in 1796, as a monotypical one with *Acarus siro* Linnaeus as type. This genus, however, is a synonym of *Acarus* Linnaeus, hence the family name should be changed to Acaridae. The *Acarus* of Linnaeus contained thirty-one species, among them being *siro*, with two varieties, *farinae* and *scabiei*. No type was originally designated. The first designation of a type was by Latreille in 1810, who selected *siro* Fab.? (= *siro* L.). Previously Latreille (1802) had established *Sarcoptes* as a monotypical genus based on *scabiei*, thus eliminating this variety and making *farinae* a synonym of *siro*, and *Tyroglyphus* an absolute synonym of *Acarus*.

This is in agreement with the interpretation of the International Commission on Zoological Nomenclature as given in Opinion 113, which placed *Sarcoptes* Latreille, 1802, type *scabiei*, in the official list of generic names. This opinion reads in part as follows: "The acceptance of *Acarus scabiei* as type species of *Acarus* is invalidated by Article 30g, according to which *Acarus siro* (syn. *farinae*) is the type of *Acarus*."

Oudemans' CLASSIFICATION OF THE GRAIN MITES.

The grain mites and a few other groups were included by Oudemans in his cohort Diacrotricha. The grain mites proper, Oudemans (1924a) first divided into ten families, to which others were added (Oudemans, 1924b). These families, while apparently constituting natural groups, are based, for the most part, upon the characters of the skin, claws and dorsal sclerites, characters previously used largely for genera. We are of the opinion that the groups of grain mites recognized as families by Oudemans are, by comparison with these of other suborders of Acarina, more properly to be accorded the rank of subfamilies. Accordingly the family Tyrophagidae is here reduced to the subfamily Tyrophaginae.

THE GENERA AND SUBGENERA OF TYROPHAGINAE.

When Oudemans (1924b) established the family Tyrophagidae, he included in it five genera, three being new. Four of these genera are very much alike, being largely differentiated upon the nature and position of certain setae, some of which are spinelike. However, one of the new genera, *Ebertia*, differs from the others in a number of characters and particularly in having the skin granulated. It is the belief of the authors that the relationships of the group would be better expressed by reducing three of these five genera to subgenera. This would give the following:

Genus *Tyrophagus* Oudemans, 1924.

Subgenera: *T.* (*Tyrophagus*) Oudemans, 1924.

T. (*Tyrolichus*) Oudemans, 1924.

T. (*Tyroborus*) Oudemans, 1924.

T. (*Povelsenia*) Oudemans, 1916.

Genus *Ebertia* Oudemans, 1924.

THE SCIENTIFIC NAME OF THE BULB MITE.

Since Banks (1906) identified the bulb mite as *Rhizoglyphus hyacinthi* (Boisduval, 1866) this scientific name has been the one usually applied to it in America. Recently, however, Oudemans (1938, p. LXXI) has pointed out that Boisduval's description of *hyacinthi* is such that it could not have applied to the bulb mite. Particularly Boisduval's reference to his *hyacinthi* as being extremely minute and very agile seems inapplicable to the bulb mite. Oudemans regards Boisduval's *hyacinthi* as a species of *Siteroptes*, a genus of Tarsonemidae. If Oudemans is correct in his identification of *hyacinthi* Boisduval, and we believe that he is, then the oldest available name for the bulb mite is *Rhizoglyphus echinopus* (Fumouze and Robin, 1868), a name that is already being used by some European acarologists.

THE AMERICAN MUSHROOM MITE DIFFERENT FROM THAT OF ENGLAND.

Specimens of *Tyrophagus* taken from mushrooms in England have been compared with specimens of the North American mushroom mite, *Tyrophagus lintneri* (Osborn), taken from mushrooms in Eastern United States. We find that the two lots represent very distinct species, those of *T. lintneri* (Osborn) differing from the specimens received from England in the following characters:

1. The sensory microseta of tarsus I is situated closer to the sensory macroseta.
2. The barbs on the posterior abdominal setae are less numerous and less conspicuous.
3. The lateral margins of the male genital armature are almost straight instead of forming a curved arch as in the male of the English species.
4. The inner sclerotizations of the male genital armature are much heavier and of a different shape.
5. In the male, the paragenital and postanal setae are very long, being over twice as long as in the species from England, and the postanal setae are situated much nearer the posterior margin of the abdomen.

STATUS OF *Tyroglyphus americanus* BANKS.

Under the name of *Tyroglyphus americanus* Banks (1906), Banks, many years ago, identified several lots of mites taken chiefly from grain and decaying fruit. A careful examination of this material, particularly of the genitalia of the males, shows that two species were confused. The most common species included appears to be identical in all respects with *Tyrophagus lintneri* (Osborn). The second species, no specimens of which were included in the type material of *americanus*, differs from *T. lintneri* particularly in the characters of the male genital armature. In it the walls of the genital chamber are outwardly rounded and come together at the top forming a "bottle-neck," and at the bottom there is no dark, curved sclerite. In *T. lintneri* the walls of the genital chamber form lateral margins that in dorsal or ventral aspect appear almost straight, while at

the top there is no "bottle-neck" formation. Also in *T. lintneri* there is at the bottom of the genital chamber a posteriorly outcurved, dark sclerite.

Since all of the seven lots included in the type material of *americanus* belong to Osborn's *lintneri*, it appears necessary to regard *Tyroglyphus americanus* as a synonym of *Tyrophagus lintneri* (Osborn).

LIST OF EQUIVALENT NAMES.

(Family Tyroglyphidae) = Family Acaridae.

(Family Tyrophagidae) = Sub-family Tyrophaginae.

Genus *Tyrolichus* Oudemans = Subgenus Tyrolichus Oudemans.

Genus *Tyroborus* Oudemans = Subgenus Tyroborus Oudemans.

Genus *Povelsenia* Oudemans = Subgenus Povelsenia Oudemans.

Tyroglyphus farinae (Linnaeus) = *Acarus siro* Linnaeus.

Rhizoglyphus hyacinthi Boisduval = *Siteroptes hyacinthi* (Boisduval).

Tyroglyphus americanus Banks = *Tyrophagus lintneri* (Osborn), new synonymy.

PROPER SCIENTIFIC NAMES FOR THREE COMMON SPECIES OF ACARIDAE.

Common grain mite, *Acarus siro* Linnaeus.

Bulb mite, *Rhizoglyphus echinopus* (Fumouze and Robin).

American mushroom mite, *Tyrophagus lintneri* (Osborn).